

Science and Art Department of the Committee of Council
on Education, South Kensington.

REPORT

BY

CAPTAIN RYDER, R.N.

ON

NAVIGATION SCHOOLS.



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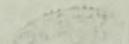
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но

MANAGEMENT SCHOOL



МАНИАГЕМЕНТ СКОУЛ
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My Lords accordingly appoint Captain Ryder, R.N., as a Commissioner of Inquiry for this purpose, and direct that he be furnished with a copy of instructions as to the points to be embraced in the inquiry. Captain Ryder will at the same time follow the general subjects of inquiry suggested by the Directory furnished to him in proof, and will consider what modifications it may be desirable to introduce before it is finally submitted to the Board for ratification.

The Secretary will send a copy of the Minute to the various Schools with a request that the Committee and Masters will give to Captain Ryder every aid in an inquiry so important to the permanent interests of the School.

GENERAL SUGGESTIONS for Captain RYDER, R.N., on the Points to be embraced in his Inquiry into the present State of the Navigation Schools.

A.—He is requested to ascertain as follows, viz. :—

1. The number of pupils in attendance, and on the books during the year, their age and rank in life ?
2. Average length of attendance of each pupil ?
3. The rate of fees paid, and the amount ?

B.—The arrangement of classes.

Dividing the school into two parts, viz. :—

1. The adult part for masters, mates, and seamen.
2. The juvenile part for boys going to sea.

The subjects taught.

The state of preparation of the boys and men respectively on entering the school ?

How taught ?

Times of meeting of classes ?

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The state of preparation of the boys and men respectively on entering the school ?

How taught ?

Times of meeting of classes ?

C.—The certificates taken by the master.

The receipts from fees, and the proportion assigned to the master.

Master's certificates.

Master's guarantee.

D.—The supply of masters.

How obtained, naming each case.

Assistant masters.

Are any more wanted?

E.—The Committee? who? and how formed?

Subscriptions? whether annual? the amount and from what quarter?

Meetings—held when? and generally what interest the members appear to take.

F.—Premises—whether independent or connected with any other institution, rent, taxes, any debt on the house, and total of expenses? how paid, whether furnished by any corporation?

G.—Total expenses of the school.

H.—It would be well to have a meeting with the Committee.

NAVIGATION SCHOOLS.—SUGGESTIONS for the FUTURE.

1. Is the certificate allowance of master sufficient?
2. If not, how to be increased? and how should he receive a fair remuneration for his labour?
3. Might not payments be made to him on success of pupils in examinations?

If so, what payment? How to be regulated?

For what subjects?

If the fees for teaching adults are remunerative, and the fees for boys not remunerative, would it be desirable to pay considerably for successful result of boys' teaching?

As the boys can attend for some time before going to sea, and may therefore be well instructed, would it be desirable to establish exhibitions to induce them to stay longer at school?

As the men only stay while their ship is in port, and can only receive an empirical instruction, would it be well to hold out inducements for them to remain longer, and receive a more thorough and systematic instruction?

Captain Ryder would do well to understand from the Art-Inspectors the working of the Art schools. In the details there is not much analogy between the Art and the Navigation schools, and it may be doubtful how far the fees in Navigation schools will support the school and the teaching, which they do to a great extent in the Art schools.

In considering the subjects of instruction, Captain Ryder will confine his attention to the special studies required to qualify those who attend these schools for their future calling as seamen.

REPORT

OF

AN INQUIRY into the STATE of the NAVIGATION SCHOOLS,
by Captain ALFRED P. RYDER, R.N., September and
October 1858.

MY LORDS,

I BEG to state for the information of the Lord President of the Council on Education that I have concluded the inquiry into the *state* of the Navigation Schools.

Before I commenced I laid down for my guidance a general principle, which I will proceed to state as its influence may be traced in my suggestions for the improvement of the Navigation Schools, viz. :—

That any undertaking entered upon by the Government or by a department of the Government should have in it of necessity the elements of success; and that if after a fair trial entire or partial failure is the result then there should be no delay in adopting one of two courses of procedure, viz., to abandon the undertaking altogether, or to make in it such radical alterations as shall ensure its success, seeing that serious injury results to the public service by the credit and prestige of the Government being weakened.

THE GOVERNMENT IS VERY ANXIOUS TO RAISE THE TONE OF THE COMMERCIAL MARINE FOR THE FOLLOWING REASONS:—

(a.) Because the Commercial Marine supplies even in time of peace a considerable number of men to the ROYAL NAVY, and because in time of war we should have to rely upon it almost entirely to enable us to man our ships when our reserves were exhausted, which would soon be the case in a naval war.

(b.) Because on the efficiency of our commercial marine depends to a great extent our position as a commercial country, and on our position as the greatest commercial country rests our supremacy among European nations.

(c.) Because to the commercial marine is entrusted every year an immense amount of valuable property. Want of skill, intelligence, and readiness of resource largely increases the yearly loss of this property.

(d.) Because to the commercial marine every year are entrusted the lives of a large and increasing number of Her Majesty's subjects. Want of skill, intelligence, and readiness of resource largely increase the yearly loss of life at sea.

(e.) Because the commercial marine consists of more than 200,000 persons, and is, therefore, an important portion of the nation, considering it numerically.

(f.) Because the commercial marine represents England, its religion, laws, customs, and habits, in every foreign country, and it is desirable that our representatives should cease to exhibit (as is now frequently the case) the worst side of the national character. Large numbers of the sailors in our commercial marine are at present neither good men nor good sailors, but are disorderly, addicted to drink, inefficient at sea and all but useless in harbour. Many of them who reach the rank of mate and master compare disadvantageously in general knowledge with the mates and masters of foreign vessels. There are of course numerous brilliant exceptions. They are to be found chiefly in the service of the large ship-owners. In knowledge of seamanship English masters and mates need not fear a comparison with those of any other nation.

NAVIGATION SCHOOLS.

The Government, anxious to raise the tone of the Commercial Marine, has endeavoured to purify the stream at its source, by the creation or support of Navigation Schools, in order that as soon as possible, by the introduction of well educated lads, its character may be elevated and improved. The Navigation Schools referred to are supported by fees, by local subscriptions, and by aid from the Department of Science and Art. Their object is to offer instruction in the scientific branches of an Education specially adapted to the Nautical Profession.

In commencing an investigation into the present position and prospects of the Navigation schools, it is evidently advisable to ascertain the number of vacancies that occur annually in the commercial marine; these vacancies are occasioned by death, desertion, and change of profession. It is much to be desired that these vacancies should all be filled by well educated English, Scotch, and Irish lads, for in time of war we could only recruit from the Commercial Marine those sailors who are British subjects.* Moreover there is an especial aptitude in the inhabitants of these islands for acquiring in perfection that knowledge and those habits which combine to form the character of a good seaman.

An estimate of the number of Lads required to supply the annual vacancies in the Commercial Marine.

This investigation may be conducted in two ways. The following attempts to make an estimate are merely rough approxi-

* It is much to be regretted that an increasing proportion of the sailors in the commercial marine are foreigners. See Appendix I. and III. During the last five years the British seamen have increased in number 6 per cent., while the foreign seamen have increased 252 per cent.

mations. I have requested the Registrar-General of Seamen to supply the department with the data referred to in the note.* When all the information is received my estimates can be corrected.

(1.) ROUGH ESTIMATE of the Number of Vacancies occasioned by Death in the Mercantile Marine.

Sailors commence their career at, on an average, 16 years of age. Landsmen have at that age an expectation of life for 35·85 years, or until the age of 52, by the Northampton Tables.

Assuming that seamen remained in active service throughout their life, the annual waste occasioned by death would be (if 200,000 is in round numbers the number of men of all classes in the commercial marine) $\frac{200,000}{35\cdot85} = 5,579$. The fact that seamen

* The following information has been asked for, and should be obtained periodically, from the Registrar-General of Seamen :—

- (1.) The number of apprentices that have shipped for the first time from each of the ports in the United Kingdom, during the years 1856, 1857, 1858. See Appendix II.
- (2.) The number of boys, *not* apprentices, that have been shipped *for the first time* from each of the ports of the United Kingdom during the years 1856, 1857, 1858. (No return.)
- (3.) The number of men that have shipped *for the first time* from each of the ports in the United Kingdom during the years 1856, 1857, 1858. (No return.)

N.B. At some of the shipping offices they make a notation against the names of first entries. This practice should be the rule.

- (4.) The number, their places of birth, &c., as nearly as can be estimated, of masters, chief mates, only mates, second mates, and seamen, including stokers, artificers, engineers, apprentices, boys, in the commercial marine. The total number of all classes in the commercial marine. The number of those that are foreigners and that are British subjects. The number of persons who have obtained certificates in each class of officers in the years 1856, 1857, 1858. See Appendix III. and IV.
- (5.) The number of deaths reported in 1856, 1857, classifying them as much as possible, as officers, seamen, &c. See Appendix V.
- (6.) In round numbers, what is the average annual waste or drain from the separate and combined effects of death, desertion, and change of profession? See Appendix VI., where I estimate the annual waste to be 10,650.

2,660 deaths from disease and accidents.

1,300 " from drowning.

6,690 " from desertion and change of profession.

3,365 annual increase, taking average of last five years.

Total 14,015 annual supply of lads required.

- (7.) Average number of seamen and officers at home and abroad. ($\frac{1}{2}$ at home, $\frac{1}{2}$ abroad.)

(8.) Average length of service afloat of a merchant sailor. Assuming that he joins between 15 and 18, at what age on an average does he cease, from whatever cause, to belong to the commercial marine? (No return.) The length of service is estimated approximately in Appendix VI. as 18 years. It is suggested that the Department should apply for similar returns every year. When it is known that they will be required, it will be easy to provide the information. Approximate returns should be particularly requested in all cases, when accurate information cannot be obtained, and if inquiries may be beneficially made in other directions, the Registrar-General should be requested to name the sources of information and to facilitate the inquiry.

rarely remain in the service to an advanced age, that many desert, that many, after one or more voyages, change their profession, only proves that the total number of vacancies is largely in excess of 6,000 annually.

Diminished by all the above mentioned causes, the average length of a seaman's career afloat is probably far below 20 years; but adopting that as the average, the number of vacancies occurring annually would be $\frac{200,000}{20} = 10,000$. See Appendix V.

(2.) ROUGH ESTIMATE of the present Annual Supply of Apprentices to the Commercial Marine.

I have ascertained that on an average, between the dates of January 1856 and October 1858, a period of two years and nine months, Liverpool and Glasgow entered about 1,100 apprentices annually.

Now the tonnage of Liverpool and Glasgow is about $\frac{1}{6}$ the gross tonnage of the United Kingdom. If ships at the other ports would take and could obtain lads in the same proportion, between 6 and 7,000 apprentices would be entered annually. See Appendix II.

We can only observe with regard to this number, that we know it can but represent a small proportion of the vacancies, as large numbers of boys not apprentices, and a large number of men, both foreigners and British subjects, are received on board yearly.

It will be well to state here, with regard to the foreigners in our commercial marine, that their presence is a great blot. They are received and welcomed at present, because the supply of English sailors is small, and the article is frequently anything but desirable. But when we remember that large numbers of English, Scotch, and Irish lads emigrate annually, it is evident that if proper measures are taken to draw them into attending the classes at the Navigation schools, and ultimately to sea, we might retain a large portion of them, so as finally to obviate altogether the necessity of our having any foreigners at all in the commercial navy.

If all vacancies in the commercial marine were filled up by lads specially educated for the profession, then we gather from the above rough estimates that, taking the very lowest, 6,000 lads would be required yearly.

It may be considered an axiom, that to become a thorough good sailor, the career should be commenced in early youth. Lads are not welcomed on board merchant ships until they are 15 or 16 years of age, and they are drawn chiefly from a class of society the boys of which have hitherto left their primary schools at from 12 to 13. There are, therefore, three years of the lad's life in which the greater portion of his time may be best spent in acquiring that knowledge bearing on his future profession, which is taught at a Navigation school. If a sufficient number of Navigation schools, made as attractive as possible, are not placed at all our seaports, the lads we wish to secure for the commercial marine will continue to be drawn off to other professions. If

schools that of necessity retain their students three years have demands made on them to the amount of 6,000 annually, it is evident that they should be sufficiently numerous to accommodate 18,000 students.

It would perhaps be inexpedient at once and on an adequate scale to attempt to provide Navigation schools for 18,000 students, nor is it probable that funds would be forthcoming for the purpose.

The first point to be aimed at would apparently be the establishment of an adequate number of schools, so as to offer scientific instruction on the lowest terms to a sufficient number of boys, to supply the demand for educated young men to fill the vacancies in the ranks of masters and mates. Their knowledge of seamanship must of course be gained before the mast.

If the proportion of 1 to 10 represents* with any accuracy the ratio of officers to men (and if in error, it is on the safe side), there are 20,000 officers in the commercial navy. Assuming that the average duration of service as an officer is 15 years, the yearly supply required is 1,300 in round numbers, and the attendance at the classes in the Navigation schools being of necessity, as stated before, for three years, there should be school accommodation for, in round numbers, 4,000 lads. If the schools opened their doors to *day* scholars only, 40 schools for 100 scholars each would be required. If in addition to the 100 day scholars, each school had an evening class of 30, only 30 schools would be required. These schools should, of course, be placed in the centres of supply, the principal seaports.

The boys who enter the commercial marine are at present and are likely to continue to be supplied from five grades of society :—

- (1.) The class of gentlemen in reduced circumstances will supply a few.
- (2.) The trading class will supply a larger number.

The parents in both these classes will generally manage to feed and clothe their sons during their attendance at the classes of the Navigation school, if the inducements to send their boys to the schools are sufficient. These boys will probably continue to be students at grammar or other schools.

- (3.) A lower class, whose sons must work for their livelihood during the day. These lads can only attend the evening school.
- (4.) A class whose sons are at charity and workhouse schools. They may be sent at certain hours to the day or evening classes of the navigation schools.

With regard to these schools, the primary inspector should be instructed to encourage them to send their boys to the navigation schools. Any difficulty about the capitation grant or his inspection should be provided for.

* 1 in 6 appears by the returns lately obtained (see Appendix III.) to more nearly represent the ratio of masters and mates to men.

(5.) The destitute class, whose sons can only, if not taken in at the union, be received on board school ships, to be clothed, fed, and taught (for expense of school ships, see note).

A navigation school should attract, not only all the boys of the classes above enumerated who may happen, for some reason or other, to *wish to go to sea* at the port where the school is situated, but also as many more healthy, intelligent boys as may be *required* to meet the demand at the port.

Early youth, it has been already stated, is the only time of life at which the special education requisite to make a thoroughly good seaman can be acquired. The period elapsing between the ages of 12-13 and 15-16, spent in developing the intellect, prepares the lad to acquire rapidly and with great facility that intimate knowledge of practical navigation and of seamanship in all its branches which is required.

A commercial navy, fed by a supply of lads that had for three years attended the classes at a Navigation school would challenge comparison for general knowledge and information with any profession in England, and would soon cease to be the last resort of those idle, troublesome fellows, expelled from the agricultural class and the various trades, who are too old, too ignorant, or too profligate ever to make even indifferent sailors.

Having stated what appears to me to be the ground that may be beneficially covered by a network of navigation schools, I will proceed to state what, in my opinion, are—

The means by which a Navigation School may be rendered most attractive and efficient,

Adding briefly in what respect the existing schools fall short of my estimate of what they should be, and offering suggestions for their improvement.*

* The school at Hull has 90 boys, of whom 40 are going to sea positively, and 40 probably.

"	Newcastle	36	"	3 probably.
"	Sunderland	46	"	46 probably.
"	Leith	8	"	0
"	Aberdeen	4	"	1 probably.
"	Glasgow	1	"	1 and 7 or 8 from the evening school probably.
"	Waterford	8	"	1 probably.
"	Liverpool	6	"	6 probably.
"	Yarmouth	{ 12, and 33 from other schools }	} 35 probably.	
"	Shadwell	80	"	12 probably.
"	Well Street	0	"	0
"	Poplar	0	"	0

If school ships, which involve a great expense, were established at the different ports, then a large portion of the boy's three years' course would be occupied in learning practical seamanship, instead of some of the higher branches of study given in the above list.

I have collected some statistics showing the expense of school ships. The Akbar, a frigate at Liverpool, is a reformatory, and has about a 100 boys.

I. A Navigation School assisted by the Government should offer sound Instruction specially adapted to the Nautical Profession.

Although at first sight the number of subjects named hereafter may appear large, and the education of too high an order, these objections will vanish when it is remembered that lads are not acceptable on board merchant ships until they are 15-16, because they are of little use, and give trouble; and yet, as has been already stated, if not attracted to the Navigation schools at the age of 12-13, and induced to remain in attendance on the classes until they are 15-16, they will be drawn into some other profession.

The course of instruction which is adopted must necessarily therefore be sufficiently comprehensive to extend over *three* years, and at the same time continue to the last to be specially adapted to conduce towards the boy's success in his profession.

The subjects which appear to be suitable for boys destined for the nautical profession and retained under instruction from 12-13 to 15-16 are-as follows :—

- *(1.) Reading and writing from dictation.
 - *(2.) First four rules of arithmetic.
 - *(3.) Grammar.
 - (4.) A complete course of arithmetic.
 - (5.) Algebra to quadratics, with application.
 - (6.) Geometry, Books of Euclid, I. II. III., and a few propositions in Book IV.
- The boys are expected to be proficient in these before entry.

The Venus, also a frigate, is in charge of the Marine Society, and anchored near Woolwich; she is a school ship for destitute lads, and has about 140 boys. In the Akbar, supported partly by local contributions and partly by the Government grant of one shilling a day for each boy, the expense of the establishment is probably reduced to as low a scale as possible. The Marine Society is a corporation which can afford to be more liberal in its arrangements. The Akbar was fitted out an expense of 1,800*l.*, but about 1,000*l.* is considered to be sufficient for a fit out, if the hull is in good repair. The Marine Society's ships are always fitted out by the Admiralty without charge. The Akbar costs about 250*l.* a year for repairs, &c.

ESTIMATE OF ANNUAL EXPENSE per Boy, deduced from Report.

	Akbar.	Venus.		
	£	s.	£	s.
Food	10	0	-	13 10
Clothes	4	0	-	6 0
Management, &c.	10	0	-	10 10
	<hr/>	<hr/>	<hr/>	<hr/>
	24	0	30	0

* No instruction need necessarily be given at the *Navigation Schools* in the subjects marked with an *, nor will proficiency in them, although tested during the *General Examination*, be taken into account when the amount of examination money (Section IX.) is estimated; but at the *Special Competitive Examination* proficiency in these subjects will count with the other subjects.

- (7.) Trigonometry, plane and spherical.
- (8.) Navigation.
- (9.) Nautical astronomy, including lunar double alt. and Sumner's method.
- (10.) Practical use of the instruments used at sea.
- (11.) Geography, descriptive, } especially as regards products,
- (12.) Geography, physical, } climates, &c.
- (13.) Chart drawing ; surveying.
- (14.) Free-hand drawing.
- *(15.) History, particularly Scripture History and English History.
- *(16.) Letter writing ; book-keeping.
- (17.) Mechanics and steam-engine.
- (18.) Magnetism and electricity in relation to ships.
- (19.) Laws of storms and tides.
- (20.) Knowledge of the code of signals.
- (21.) Mercantile laws and usages, as far as is necessary for the master of a merchant ship.
- (22.) Gymnastics.

There is only one school (that at Hull, where the boys are induced to attend for from three to four years,) where this course is attempted, and with considerable success. In the other schools few boys at present attend over one year, and in some instances for no longer a period than three months.

II. A Navigation School aided by Government should provide a good supply of apparatus, viz., instruments, books, maps, slates, &c. without any charge to the pupils.

As a general rule the supply is good. In some of the schools additional apparatus is required. Their wants will be stated in another portion of the report.

The rule has been for the local committee and the Department to divide the expense of the apparatus, the fittings being entirely paid for by the local committee.

In Ireland a very liberal supply of sextants, books, maps is given to each school by the Board of Education.

III. A Navigation School aided by Government should offer valuable prizes in the shape of exhibitions, instruments, books, &c.

The great difficulty we have to contend with is the reluctance on the part of some parents, the inability on the part of others, to maintain their children during the three years' course.

Exhibitions and prize-schemes should therefore be established on the most liberal footing.

Prizes had been awarded by the Department in only two or three instances before my tour of visits.

(a.) I beg to suggest that prizes be awarded, when deserved, at all the schools every half year.

* See note *, p. 11.

The prizes to consist of sextants, watches, instruments, books, &c. The future prizes to be placed at the commencement of the half-year under the charge of the local committee, to be exposed in the schoolroom in a case with a glass lid or cover. (The half-yearly value of the prizes to be about 15*l.*) ; the prizes to be fairly and openly competed for.

A very limited number of sextants should be given away, not more than one each half-year among all the schools. The prizes not to be awarded except on the most satisfactory proof of the lad's sufficient proficiency.

(b.) I beg to suggest that *exhibitions* be established on the following scale, viz., at the rate of twelve for a school giving instruction to 100 boys, or one to every eight boys, and be awarded at all the schools every half year.

The boys after the examination to be divided in the following manner :—

The FIRST DIVISION to consist of all the boys who had attended the Classes for a period under 6 months.

The SECOND DIVISION to consist of all the boys who had attended the Classes for 6, and under 12 months.

The THIRD DIVISION to consist of all the boys who had attended the Classes for 12, and under 18 months.

The FOURTH DIVISION to consist of all the boys who had attended the Classes for 18, and under 24 months.

The FIFTH DIVISION to consist of all the boys who had attended the Classes for 24, and under 30 months.

The SIXTH DIVISION to consist of all the boys who had attended the Classes for 30, and under 36 months.

Exhibitions at the rate of one in eight boys to be given to the most successful boys in each group.

The exhibitions for the 1st and 2nd Divisions to consist of remission of fee and a donation of 6*d.* a week for ensuing half-year.

The exhibitions for the 3rd and 4th Divisions to consist of remission of fee, and a donation of 1*s.* a week for ensuing half-year.

The exhibitions for the 5th and 6th Divisions to consist of remission of fee, and a donation of 2*s.* a week for ensuing half-year.

This part of my proposal is elastic, the value of the exhibitions can be increased if the principle is approved of, and the number may be extended even to offering an exhibition to every boy attaining a certain degree of proficiency in the studies of the school.

The chief merits of this plan are (1), that as all the exhibitions are thrown open for competition every half-year, the spirit of emulation is constantly kept alive ; it is notorious that the attainment of an exhibition or scholarship which will be held throughout a student's career is often the prelude to idleness. (2.) That exhibitions are placed within the reach of the youngest boys.

The examination to decide on the exhibitions and prizes should take place at the end of the half-year. The questions to be sent from the Department, and the answers to be sealed up in the presence of the boys, and sent to the Department on the evening of the examination day. The prizes and exhibitions should be awarded at the commencement of the next half-year. As the examination should not, if possible, extend over more than one day, the Department might make a selection from among the subjects taught. As the inspector cannot be present, one or more of the local committee should remain in the school during each examination.

The result of each examination should be allowed to be published in the local papers ; competition will then be created among the various schools at the sea-port, who will view with great interest the position of their boys on the examination list.

(c.) I beg to suggest that all boys who have held exhibitions or gained prizes receive on leaving a *vellum certificate*, naming the fact, and that some of the most deserving receive *medals*, and that those who hold *exhibitions* wear a *badge*.

(d.) I beg to suggest that all boys who bring a good character from their captain or shipowner, and that have served on board for one year since they left the navigation school, with a good character, be entitled to receive 1*l.* from the funds of the school.

(e.) I beg to suggest that shipowners be induced, if possible, to take boys as apprentices who have attended classes at the Navigation school ; this will give a great impetus to the school.

(f.) I beg to suggest that the Board of Admiralty be requested to encourage the schools, by drawing their first-class boys from those who have attended the classes.

(g.) I beg to suggest that the Board of Admiralty be requested to encourage the schools by throwing open to competition among the prize boys of each year the nominations to master-assistantships, at the Greenwich rate of about 1 to every 100 boys yearly.*

(h.) I beg to suggest that the Board of Admiralty be requested to instruct the captains of coastguard ships and commanders of districts to pay an occasional visit to the schools.

An invitation to the boys to visit the coastguard ship would be highly appreciated by them.

* The pay of a master's assistant is 60*l.* a-year, and he receives rations. Master's assistants become second masters, masters, and ultimately retired commanders and captains.

IV. A Navigation School aided by Government should provide an ample Educational Staff, whose income should be sufficient, and a certain portion of it fixed, and whose energies should be mainly directed to the Education of the Boys.

The educational staff, as a general rule, is very insufficient, owing to a school for adults having been generally established in connexion with the school for boys.* This course was adopted chiefly for economical reasons, it being intended that the large fees from the adult class should pay the greater proportion of the expense of the school ; but it has resulted in the boys' school being most seriously injured, as follows, without any compensating advantages.

The boys who pay fees, from 6*d.* to 1*s.* a week, are constantly and unavoidably neglected by the head master, whose interest it is to attend to the adults who pay from 5*s.* to 7*s.* a week ; and even if superior to that motive, the head master cannot leave the adults for more than a few minutes at a time, because, and not unnaturally, they insist on his remaining with them.

The attempt to apply to navigation schools the self-supporting principle successful in other cases has almost entirely failed ; for, whenever an assistant master or master in training (as he is erroneously called, for he receives no training) is appointed, (and when adults and boys are both present, an assistant master is imperatively demanded,) his salary has always, if an assistant master, to the amount of 40*l.*, if a master in training, to the amount of 78*l.*, been paid by the Department.

Moreover, none of the schools are supported or assisted by local subscriptions. (The Trinity Corporation Schools at Hull and Newcastle are, of course, exceptions.)

The schools have almost entirely failed to win the sympathy or obtain the pecuniary support of the inhabitants of the seaport towns, after the first subscription list for purchasing the site and fittings has been closed, except in some very rare instances.

Moreover, the theory that the Navigation schools can be considered as likely to be in any sense of the word self-supporting, is a fallacy, and can easily be proved to be so.

A navigation master who has a class of 12 adults on an average will find his time fully occupied. The adults consist of masters, mates, and seamen who are being *crammed* for their examination before the local marine board for their certificate, on which their future advancement depends. They are content, therefore, to pay what they consider a high fee, provided they are crammed *rapidly*. They insist on constant attention. They are frequently very ignorant, and, remaining for only five or six weeks, cannot be placed in classes ; individual teaching is necessary, therefore, in every case, hence the small number that one master can teach satisfactorily.

* The school at Hull is the only navigation school at which no adults are received.

These 12 adults, paying 5*s.* a week, will produce a sum in 46 weeks (allowing the master six weeks' holidays) of 138*l.*, deducting one-third of that sum, 46*l.*, for local expenses, a sum is left of 92*l.*, barely sufficient to pay the master, whose whole time is occupied, throwing him back (during the quarters when the adults are below the average) on his guarantee of 100*l.* from the Department, which, as it extends over only the first year, leaves his future income on a most precarious basis, disturbing his comfort and equanimity, and producing a strong feeling of annoyance and discontent, which, if not allayed by a change of system, will lead, I am fully persuaded to the present race of masters resigning their positions, and promulgating such reports of their treatment, as will prevent any but very inferior men from accepting the appointments.

I have shown above that the adult class only pays, and very insufficiently, the head master, leaving the fees of the boys' class to support, as far as may be, the assistant master. This they, of course, cannot do. Forty boys (the largest number one man can manage, and too large to be managed well) at 6*d.* a week will produce in 46 weeks 46*l.*; deducting one-third, or 15*l.* (an insufficient amount) for local expenses, 31*l.* remains for the master, who, being entitled to 80*l.*, receives the balance of 49*l.* from the Department and the local committee. The latter, having to make up the 9*l.* from the only fund in their possession, their third of the adult masters' fees, are discontented, regard the boys' school as a failure, and as a general rule, with some exceptions, take little or no interest whatever in it. The answer I generally received, when I inquired as to its progress, was as follows :—

"The Department insisted on our establishing a boys' school in addition to the adult school, and therefore we have one; but it's a great expense, and the fees won't pay both masters and the local expenses, and there must be a change."*

Any analogy attempted to be drawn between the navigation schools as hitherto conducted on the one hand, and primary schools on the other, is fallacious, for the following reasons :—

In connexion with primary schools there is almost universally some active clergyman, layman, or committee, who by his or their exertions supply any deficiency that there may be after the receipt of the Government subsidy and the children's pence.

To find any such person or committee in connexion with the Navigation schools is the rare exception. In many cases the majority of the committee have seldom been within the walls of the building or attended a meeting. No analogy can be drawn, therefore between the cases of primary and Navigation schools. I believe one of the chief reasons of this indifference on the part of the local committees is that the Navigation schools have been regarded as purely secular schools competing with the denomina-

* The boys' schools at Leith, Aberdeen, Glasgow, Waterford, and Liverpool are at present more or less failures.

national schools in the town for the education of the boys who are going to sea. When it is thoroughly understood that the Navigation schools are designed to be purely scientific schools, established to teach certain branches of science as are the Art schools to teach certain branches of art, the greater portion of the indifference and opposition I have noticed will cease, and the local committees of the various schools at each seaport will be willing to send to the Navigation schools, at certain hours of the day, those of their boys who wish to go to sea.

There is, however, this difference between Art schools and Navigation schools, that the former are self-supporting because they teach an accomplishment which is coveted by persons in such ranks of life as enable them to pay readily considerable fees for instruction. If ladies and gentlemen would, in the same numbers and paying the same fees, take lessons in navigation and its cognate sciences, Navigation schools might be made self-supporting, for the students would import into the classes the same courteous treatment of the master, the same patience and forbearance which they evince in the drawing classes, which would enable *one* master as in those classes to instruct at the same time *a large number* of high paying pupils ; but as this is impossible, Navigation schools cannot be expected to be self-supporting to the same extent as are Art schools.

It must not be supposed that the Government navigation master is the only instructor in navigation in the seaport towns. He has invariably a rival or rivals with whom there is a continual struggle for the adult students. The natural result is that the head masters, although, with hardly an exception, zealous intelligent men, yet as their pay has been made dependent on the fees of the adult classes, (which are large, from 5s. to 7s. a week, while the boys vary from 6d. to 1s. a week,) they very naturally lay themselves out by incessant attention to the adults to induce as many to come as possible.

As Navigation schools are now constituted, the head master during the whole of the day, and in many cases throughout the evening also, throughout Saturday, throughout the Christmas and Midsummer holidays, has his attention devoted to the adult school, which is of course in another room.

I have spoken of the instruction given to the adults as merely *cramming*. That it deserves this name arises from the following fact,—The examination of the masters and mates at the examiner's office is not sufficiently searching to make it necessary that the persons presenting themselves should have acquired more than a merely mechanical facility in working certain questions in navigation and nautical astronomy. No questions are asked them to test their acquaintance with even the most elementary principles of the science.

So long as this continues to be the case, and the Government insist on no higher attainments on the part of the masters and mates, so long will the labours of their instructors, whether they are Government navigation masters or private individuals, be

confined merely to *cramming* the masters and mates for their examinations. And so long as one of the duties of the head master of a Navigation school aided by Government is to prepare adults for examination, and *he is given a large but varying pecuniary interest in the work*, so long will a highly educated, active, zealous schoolmaster, whose talents fit him for a large measure of success in the much higher and more important duty of instructing boys, be wasted in *cramming* adults, one of the most repulsive occupations that can be undertaken by a zealous and enlightened instructor.

If the instruction given to the adults by the navigation schoolmaster was of a much better quality than that given by his rivals, more decided benefit would result from maintaining the school for adults ; but the only benefit which the Government schoolmaster appears to confer on the adults is, that by being a better educated man he prepares the adult *quicker*, in five weeks perhaps instead of six ; and being paid to a certain extent by the Government, and not having to pay rent for the schoolroom, his charges are *cheaper*. There is also this advantage in the presence of a Government schoolmaster, that the charges of his rivals are kept down.

There is a general opinion, that as Government has insisted on the examinations, it should provide a schoolmaster. If the Board of Trade, as is much to be desired, raises the standard of examination of the adults, so as to ensure their being grounded properly, then the services of the instructor of the adults will be much enhanced in value, and great pains and labour will be well bestowed on the adults. But even if this alteration took place, I still beg to suggest that *the head master, although responsible for the whole school, be directed to address his whole energies to the boys', entrusting the direct teaching of the adults to an assistant master specially prepared for that duty.*

To ensure this order being strictly obeyed, there is but one sure and certain course to pursue, and that is to *discontinue making the head master's salary dependent on the fees received from the adults*. The mode of paying the head master which I suggest, will be stated presently, and will be found to contain in it amply sufficient incentives to exertion in bringing his boys on. I propose that the educational staff in each school consist of a head master, who has supreme charge over all the schools or classes ; one assistant master to have sole charge of the adults* with another assistant under him if they are too numerous, and a sufficient number of assistant masters and pupil-teachers working in the boys' school under the head master.

The head master should not, if possible, be removed by the Department, or allowed to leave of his own accord, except at

* If the schools receive, as I propose they shall, aid from the surplus money derived from the fees charged to the adults by the examiners for their certificates, the adult class must of course be continued.

three months' notice, and assistant masters at two months' notice.*

At present there are five different classes of instructor :—

1. *The head master*, paid by a share of the fees, and guaranteed 100*l.* for one year, if his income from all sources falls short of that sum.
2. *The assistant master*, paid { 40*l.* by Department, and 40*l.* by committee.
3. *The master in training*, paid 78*l.* by Department.
4. *The pupil-teacher acting as assistant master*, { 20*l.* by Department, 20*l.* by local committee.
5. *The pupil-teacher* receiving 10*l.* from Department.

The name of master in training is a misnomer, as they receive no training.

I propose that there should be only three descriptions of instructor :—

(1.) The *head master*, receiving payment under various heads : (1.) part of his salary to be fixed, to give him some certainty ; (2.) part variable and rising with his acquirements, viz., the group money ; (3.) part variable and dependent on the proficiency shown by the boys at an examination.

(2.) Two classes of *assistant master*, viz., an *assistant master* to instruct the adult class. He would receive payment under various heads : (1.) part of his salary to be fixed ; (2.) part variable, his group money ; (3.) part variable, being a portion of the fees of the adult class.

An *assistant master* to instruct the boys under the head master. He would receive payment like the head master : (1.) part fixed ; (2.) group money ; (3.) variable, and dependent on the proficiency of the boys.

(3.) *Pupil-teacher* to instruct the boys. He would receive payment under two heads : (1.) a fixed salary ; (2.) part variable, and dependent on the proficiency of the boys.

If this principle of payment is adopted, the ratio that the fixed payment shall bear to the variable will be a subject for serious consideration. I propose that the *total* payment of the masters shall be increased about 30 per cent. on its present rate, and that the *fixed* annual payments be,—

Head master	100 <i>l.</i>	These sums can of course be differently adjusted by the Department, if the principle is admitted.
First assistant master, for adults	80 <i>l.</i>	
Second assistant masters, for boys	60 <i>l.</i>	
Pupil-teacher	15 <i>l.</i>	

* Two of the local committees were very much aggrieved at the sudden removal, without notice, of masters.

The group* payment is a well devised scheme to induce the masters to improve themselves, but has been the cause of a great deal of discontent. The head master has no inducement to pass for more groups unless his share of the fees exceeds about 80*l.*, enabling him to clear his guarantee, and the assistant master, receiving no group money at all, has still less inducement to improve himself. *They all state that they were informed that the group money would be paid in addition to their other sources of income.*

I propose that all the masters and assistant masters be allowed their *group money* in addition to their other incomes.

The head masters in charge of adults have found the work so onerous, and the absence of holidays so wearying, as almost to incapacitate them for preparing to pass more groups.

Superannuation.

I am aware that the Committee of Council of Education have decided on not at present entertaining any proposal for superannuating their masters, but I foresee that as the navigation masters discover that their requirements fit them for more remunerative positions than the masterships of navigation schools, they will leave the Department. One assistant master has just left at a few days' notice, and others are contemplating the step.

To obtain and keep the services of the zealous, intelligent, and very superior men who alone are fit to take charge of navigation schools, I believe a superannuation allowance would be at the same time the greatest and most economical inducement.

I beg to suggest that at 60 years of age a navigation master be allowed to retire with his group money as an allowance. This would be a great inducement to remain in connexion with the Department, and to pass in as many groups as possible.

Payment to Masters depending upon the Proficiency of the Scholars.

The direct inducement which I propose to give to the educational staff to bring their schools up to the highest state of efficiency is a *payment in money*, and I have been induced to pro-

* The masters receive an increase of pay for each group of subjects they pass an examination in :—

Group I. A general acquaintance with the mathematics bearing on navigation	£	5
Group II. General navigation and nautical astronomy	-	15
Group III. Adjustment and skilful handling of instruments	-	5
Group IV. Physical geography	-	10
Group V. Physics, mechanics, marine steam engine	-	10
Group VI. Chemistry	-	5
Group VII. Natural history	-	5
Group VIII. Chart, freehand, and mechanical drawing	-	5
		<hr/> <hr/> £50

pose this from the sense of the paramount advantage derived in any undertaking from making it the direct *pecuniary* interest of agents to act up to their instructions.

I propose that every head master, every assistant master and every pupil-teacher employed in teaching the boys shall receive a sum of money in addition to his *fixed salary* and his *group money* to depend on and vary with the success of the school at the half-yearly examinations. The mode by which I propose to estimate the amount of this payment will be detailed further on, when I speak of inspections.

It consists of a sliding scale of payment, so contrived that it is the direct pecuniary interest of the head master to bring *all* his boys up to the highest state of proficiency, and also the direct pecuniary interest of *all* the educational staff to *refrain from forcing on the clever boys, if by so doing they neglect the duller boys, and also to refrain from drawing the boys into the upper and more showy subjects to the neglect of the lower, more elementary, but more important subjects*, errors commonly and but too justly ascribed to schoolmasters in their endeavours to give to their schools the *appearance* of high efficiency.*

V. *The Masters of Navigation Schools aided by Government should display great intelligence and aptitude for teaching and should be intimately acquainted with the best methods of instruction.*

As a general rule I have found the masters intelligent and apt to teach. The majority of them have enjoyed the privilege of an education at Greenwich under Mr. Riddle.

It is important that the masters should be drawn from some normal school; Greenwich school appears admirably adapted for such purpose. To draw a large supply of masters from that school, and retain their services, the position of the masters in

* I am aware that the sliding scale of payment which I propose has the demerit of novelty.

The Committee of Council, fully alive to the advantage of a sliding scale, have provided that, in the *primary schools*, the master's pay shall depend on and vary with the school pence and the capitation grant (a grant which is made to depend upon the attendance of the children), in the *art schools* it is made to depend on and vary with the number of prizes won by the students.

The disadvantage of the former plan is that the sliding scale, being made to depend upon *mere numerical attendance*, both *particular proficiency* and *general proficiency* are ignored.

The disadvantage of the latter is that it is made the master's direct pecuniary interest to force on the clever boys to the neglect of the dull boys, while *general proficiency* and *numerical attendance* are ignored.

There are doubtless good reasons why these very different plans should have been adopted in primary and art schools.

In the scheme of varying payment which I propose for *navigation schools*, both the *general proficiency* of the *school* and the *numerical attendance* of the scholars are made the measures of the masters' emoluments, while the proficiency of individual boys is fostered by prizes and exhibitions.

a pecuniary point of view must in my opinion be improved. But if this is done an engagement should be entered into to remain as a navigation schoolmaster for a certain time, and after that, not to leave without at least two months' warning.

The Qualifications of the Masters.

I beg to propose that examinations for the position of assistant masters be held half-yearly, and that the examinations be open to all persons whose credentials received previously by the Department are satisfactory. The qualifications being, good character, experience in teaching, and proficiency in all the subjects taught in the navigation schools.

Assistant masters, previous to nomination to head masterships, to pass a second examination. The vacancies among the head masters to be filled up, if possible, by persons who have held in the navigation schools the position of assistant master.

VI. The Masters of Navigation Schools aided by Government should be zealous in the performance of their duties.

As a general rule, the head masters show great zeal, but as their pecuniary interests and the urgent calls of the adult class almost entirely draw off their attention from the boys, the latter suffer as much in many cases as if they had a master the reverse of zealous.

To concentrate the head master's attention on the boys, I have proposed that he should cease to participate to any amount in the fees paid by the adults. But as head master he will, of course, have supreme charge of the whole school. The assistant master teaching the adults, will follow his instructions strictly.

VII. The Navigation Schools aided by Government should be judiciously situated, have large airy rooms, a good playground, gymnastic poles, and a lending library.

The schools are frequently well situated, but in some cases may be moved with advantage. The schools should of course be as near to the docks as possible. In building new schools this important point should never be lost sight of.

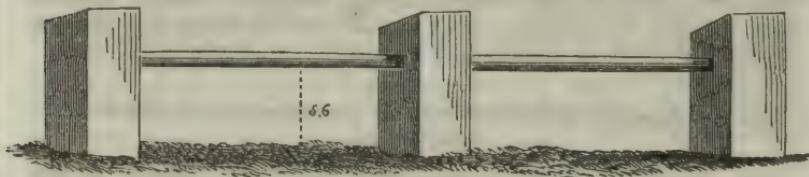
The site is generally low, and the ground is probably expensive, but this is unavoidable. *If the school is to hold adults and boys, three rooms are indispensable*, one for adults, one for the upper or nautical classes, and one for the lower or preparatory classes.*

The only school that has a good playground is Hull, the model school in every respect. Exercise at gymnastics is most beneficial to the boys' health, and confirms them in their choice of the

* In ports where it is impossible to obtain a site on shore, a hulk might frequently be obtained and moored alongside the quay. The Lords Commissioners of the Admiralty have granted various old hulks for this and similar purposes.

naval profession. The lads when they go to sea are much more useful aloft if they have acquired the agility and daring which can alone be gained by gymnastic exercises.

One of the causes of the rapid deterioration in the *physique* of our sailors is the diminution of work aloft consequent on the introduction of steam. When the attention of the local committee is pointedly drawn to the subject of gymnastics, any difficulty in obtaining ground for the purpose can generally be surmounted. The ground under the poles should be covered with tan to lessen the chance of serious accidents, and for the same reason the poles and their supports should be of considerable strength.



A paper of instructions on gymnastic exercises might be obtained from Greenwich, where the lads are distinguished for their skill and agility.

There should be in each school a lending library of books containing information generally useful, and some others of a lighter description. The privilege of using it might be confined with advantage to those boys who continued their studies in their evenings at home. The confining the privilege to these boys would incite to evening work, whereas if the privilege was given to all, evening work would be neglected for the sake of reading the books.

Evening work is a valuable feature in the most successful navigation schools.

VIII. *The Fees in a Navigation School should be carefully adjusted,*

so as not to exclude by their amount any poor boys whom we might wish to admit, or to repel by their insignificance those parents who would attach no value to that which cost them little.

The boys' fees vary from 6d. to 5s. a week.* I propose that they vary from 1d. to 1s. a week.

The fees will probably vary, and justly, in every port.

The number of boys required,—the number forthcoming, and various other considerations, will affect the fees.

I am inclined to prefer, when it can be adopted, the plan of a varying fee, according to the position of the parent, a plan which worked so well in the model school of the Dean of Hereford. If my proposal for paying the masters is adopted, the larger portion

* At Hull the boys are admitted free of fee.

of the fees, after deducting a certain fixed sum, or a certain definite proportion of them for local expenses, will stand in the school accounts to the credit of the local committee, and will be expended from time to time, with the consent of the Department, in paying the masters' salaries, the boys' exhibition money, &c.

In some primary schools where there is a varying fee, its amount is left optional with the parent ; in others it is fixed in each case by the committee. In some seaports, where there is a pertinacious disinclination on the part of the parents of the boys to their going to sea, I have suggested to the committee the undertaking to return all or a portion of the school fees of any boy who has passed above a certain mark, on proof being received that the boy has sailed. This would in many cases act both on parent and child as a great inducement to the boy to go to sea.

IX. Navigation Schools should be periodically inspected and reported on.

No systematic course of inspection has been adopted in the schools. There is but one opinion, I believe, on the great importance of periodical inspection.

Two inspections in the year would, I think, meet the requirements of the navigation schools.

Inspection to be really valuable should be *thorough*. Now the subjects in which it is proposed that the boys shall be taught at the Navigation school are very numerous, and none of them should, if possible, be allowed to escape the notice of the inspector and the test of examination.

Assuming that the schools gradually increase in number to 30, and that they give instruction to, on an average, about 100 boys each ; that the inspection takes place twice a year ; that examination money is paid to every master, assistant master, and pupil-teacher, depending for its amount on the proficiency of the school ; and that the examination is so conducted that the schools can be compared together,—the problem to be solved is, to devise a systematic scheme of inspection which shall gain these ends and enable each of the schools to be thoroughly examined in all the 22 subjects in as short a time as possible.

Time is important, because it is very evident that the 30 proposed schools will be widely separate, being situated on the coasts of the United Kingdom, and one day will be fully occupied in proceeding from one school to the other. To bring the whole inspection within a reasonable compass, and to enable the proficiency of the schools to be compared together, I propose that, if possible, no longer time be spent at each school than *one day*.

30 days travelling on Tuesdays, Thursdays, and Saturdays.

30 days inspecting, Mondays, Wednesdays, and Fridays.

10 Sundays.

70 days, or 10 weeks.

Allowing for occasional delays, three months will be occupied in each inspection. The committee would be met, by appointment, between noon and two o'clock on the examination day; the master might be seen on the preceding evening.

To inspect a school thoroughly, where the instruction embraces so large a number of subjects, would occupy from three to four days, if the usual plan of allowing all the boys to work at all the subjects was adopted, and the amount of papers to be looked over would be very considerable.

I propose that there shall be two examinations every half-year, (1) the *general examination*, to measure the progress and proficiency of the navigation classes, and the payment to be made to the educational staff; (2) the *special competitive examination* for prizes and exhibitions. The first will be held in the course of the half-year, in the presence of the inspector and master, the answers, however, to be looked over and valued in London. The second has been already alluded to in Section II., and will be held at the close of the half-year, in the presence of the master and of one or more of the local committee. It will be entirely a written examination, the questions to be sent from the Department. To prevent any suspicion of unfair treatment, the examination books should, after each examination, be sealed up at the close of the day, in the presence of the boys, and sent to London. The prizes and prize studentships will be awarded when the school meets again, at the commencement of the next half-year. The answers will be valued in London, by a person appointed for that special purpose. The practice I have adopted is to give full numbers for an accurate answer, half numbers for an answer which, though inaccurate, shows intelligence.

The inspector who conducts the general examination should have with him various papers of questions of equal value on each subject, so as to diminish the possibility of information as to the questions set at the examination being communicated from one school to the other. The masters have a direct pecuniary interest in preventing any information being sent to the other schools.

I suggest that the *general examination*, to ascertain the amount of *examination money*, be conducted in the following manner:—

The school to be arranged previous to the arrival of the inspector, in five classes, each class separated from the other as far as the arrangements of the school will admit, and the five classes to be so composed as to be about equal, both in average and collective intelligence. No difficulty is experienced by the masters in doing this. The simplest method adopted on my recommendation is to arrange the boys in one long line according to their order of merit as ascertained at a previous examination, give each boy the number of his place, and then separate them into five classes, as follows. This division into classes may be safely left to the head master, as it is his interest that the division should be fair. In many cases his knowledge of the capabilities of the boys will render the previous examination unnecessary.

CLASSES.				
I.	II.	III.	IV.	V.
1	2	3	4	5*
10	9	8	7	6*
11	12	13	14	15
20	19	18	17	16
21	22	23	24	25
30	29	28	27	26
31	32	33	34	35
40	39	38	37	36
41	42	43	44	45
50	49	48	47	46
51	52	53	54	55
60	59	58	57	56
61	62	63	64	65
70	69	68	67	66
71	72	73	74	75
80	79	78	77	76
81	82	83	84	85
90	89	88	87	86
91	92	93	94	95
100	99	98	97	96
1,100	1,100	1,100	1,100	1,100

It is evident that the classes will be of nearly equal intellectual value, and each will represent one fifth part of the school as regards ability and proficiency, being composed equally of advanced and backward boys.

The inspector will then select hap-hazard, and without any previous concert with the master, the class which is to commence immediately working at the various subjects, as for instance,—

Forenoon, 9 to 12.

Afternoon, 2 to 5.

- | | | |
|---|--|--|
| I. Class | - { Arithmetic.
Algebra. | { History.
Mechanics. |
| II. Class | - { Trigonometry.
Geometry. | { Free-hand Drawing.
Chart Drawing. |
| III. Class | - { Navigation.
Nautical Astronomy. | { Letter Writing.
Writing Dictation. |
| IV. Class | - { Physical Geography.
Magnetism. | { Mercantile Law.
Law of Storms and Tides. |
| V. Class
Oral Examina-
tion. | - } Reading.
Grammar. | - } Descriptive Geography.
Instruments.
Signals. |
| | The whole school in Gymnastics. | |

* The equality of the division depends upon 6 being placed in the same class with 5, 10 with 1, and so on throughout.

The number won by the boys in a class in a particular subject will be added together and divided by the number of boys in the class ; the result will be the mean number for that subject for that class, and the classes being equal, that number will be a measure of the proficiency of the school in that subject. The number of boys in the school multiplied by the sum of the mean numbers will be the number which will determine the sum of money to be apportioned to that school, and divided among the educational staff.

I propose that, as a general rule, with perhaps a few exceptions, 100 shall be the full number for each subject. Giving 100 for the low subjects will induce the masters to pay great attention to the boys' proficiency in them.

Let us suppose that the mean number obtained in the various subjects were as follows, see Note, p. 5 :—

	Mean No.	There being 100 Boys, gross Number.
<i>Trigonometry</i>	82	$100 \times 82 = 8200$
<i>Arithmetick</i>	72	$100 \times 72 = 7200$
<i>Navigation</i>	91	$100 \times 91 = 9100$
<i>Algebra</i>	61	$100 \times 61 = 6100$
<i>Geometry</i>	94	$100 \times 94 = 9400$
&c.	&c.	&c.
		Suppose - - - 91,700

Then 91,700 would express the aggregate proficiency of the school in question.

The results of the examinations of the schools would be, that each school would obtain different numbers, as for instance,—

<i>Hull</i>	-	-	-	-	123,200
<i>Yarmouth</i>	-	-	-	-	91,700
<i>Newcastle</i>	-	-	-	-	15,300

I propose that a sum of money, at the discretion of the Department, be divided* once a year among the schools, in the ratio of the numbers obtained as above, and that notice be given to them to that effect at the commencement of each year, naming the total sum. I propose that the sum won by the school should be divided among the educational staff in the following proportions:—

	£
Head Master	5 shares, but total not to exceed - 30
Assistant Masters,	
each - - 2 shares,	" " 12
Pupil-Teachers,	
each - - 1 share,	" " 6

* I prefer this to any other plan, because the stimulus to exertion will be greater.

As every progressive step made by the dullest boy who attends the classes tells on the gross number, and through it on the pecuniary gain of the whole staff, the staff will have no temptation to neglect, but on the contrary, every inducement to push on the dull boys, and as proficiency in the lower subjects counts as much as proficiency in the highest, the common fault of neglecting the low subjects would evidently diminish very much the profits of the staff, and will therefore be prevented.

I consider this sliding scale would be preferable to paying the master a certain sum for every prize won in the school, which is a direct temptation and inducement to him to select from time to time the most promising boys, and put them under pressure to make prize boys of them, neglecting the dull boys of the same standing who cannot on that system of reward be productive of any benefit.

Collateral Advantages of this System.

(1.) It becomes the direct personal interest of the staff to retain the boys as long as possible, in order that at each examination, there shall be as many boys as possible well advanced in all the subjects.

(2.) That it becomes their direct personal interest, to select from among the boys presenting themselves for entry, those that are most advanced in the elementary subjects, so that their backwardness may diminish the mean numbers as little as possible.

(3.) That it becomes their direct personal interest to work the school with as few masters as possible, as thereby their individual gains are larger.

(4.) Competition is created among the Navigation schools and their educational staffs. The result of each examination should be allowed to be published in the local papers, and the results of the examinations at all the Navigation schools should be made known at each school.

(5.) The inspector and the Department can see at a glance whether any Navigation school has neglected any subject. The masters could not evade the rigour of this test by any artifice.

(6.) The boys will be induced generally to enter into the spirit of the competition, which will have the best effect. A few only can win the prizes and exhibitions, but all can contribute by their exertions to the comparative success of their school.

(7.) The local committee and the neighbourhood would enter into the spirit of the struggle.

As a long time must elapse between the examination of the first and last school during an inspection, and as the boys are progressing during that time, it is evident that the school first inspected will compare at a disadvantage with the school last inspected. I propose therefore that the school first inspected at

Midsummer be the school last inspected before Christmas, and *vice versa*, the tour of visits being inverted, and that the mean number for each subject to be used in calculating the examination money be the mean of the two numbers obtained at Midsummer and Christmas. In this way the inequality referred to may be eliminated.

I have frequently noticed during examination that talking and copying are very common. Of the latter fault—it may almost be called a vice—the masters do not appear to take any sufficient notice. I beg to suggest that the inspector, in addition to noting carefully the state of the schools as to cleanliness (of rooms and boys), and as to discipline as shown by silence and no copying, adopt the following method of cure with regard to the latter fault.

As it shows an evident neglect of moral training of the students on the part of the educational staff, and when practised successfully, conduces to the pecuniary benefit of the staff, the punishment should be summary, and conduce to their pecuniary loss. Any boy detected in the act of copying should forfeit all his numbers, and although still counted on the strength of the class, he should not be counted on the strength of the school when the number representing the aggregate proficiency is calculated.

In this way the master would lose all that the boy had or would have contributed to the aggregate number, and the mean number would be diminished by his presence on the strength of the class.

If at a school where there was one head master, one assistant master, and three pupil-teachers instructing boys, 50*l.* was the sum won :—

The head master receiving five shares would have 25*l.*

The assistant-master two " " 10*l.*

And each pupil teacher one " " 5*l.*

in addition to the two other sources of income, viz. the *fixed salary* and the *group money*.

I do not propose that there should be any inspection or examination of the evening classes. They will probably be composed of boys more advanced in age, but very probably less advanced in knowledge than the day classes, and it would be almost impossible to classify them. I propose that a definite proportion of the evening class fees say one half should be divided among the educational staff in the proportion already given. They would take their turn of attendance according to a system of rotation drawn up and approved by the local committee ; the other half of the fees to be paid to the local committee.*

The assistant master in charge of the adult school would be paid a proportion of the adult fees, say one-tenth, and his share of the evening fees if he taught there, but he of course would not share in the boys' examination money.

* The prize scheme for evening classes which has been established by Sir James K. Shuttleworth might be extended with advantage so as to include the evening classes of the Navigation schools.

X. A distinctive Dress or Badge is calculated to have a very good effect on the Navigation Schools.

The Trinity Board at Hull gives to 80 boys in the Navigation school a neat uniform (blue jacket, blue and white trousers, and blue cap). This has a capital effect on the boys, gives them an *esprit d'école*, and acts as a restraint on their conduct outside the schools. I am not prepared, owing to its expense, to recommend the adoption of a dress, but a badge of some kind on the arm or cap would have a good effect.

Note.—The whole expense of teaching and clothing at Hull averages very little more than 6*l.* per boy per annum.

XI. In Navigation Schools great pains should be taken to ensure punctual Attendance on the part of the Boys.

The attendance varies very much in the Navigation schools. In some it is very good, in others indifferent. In the best schools careful registers are kept, from an inspection of which the average attendance may be seen at a glance. I beg to suggest that the best form of registers be provided, and that it be made imperative that the register be strictly kept in all the schools, and that the following practice be universal instead of partial, viz., that any boy arriving late is expected to produce a written authority from the master of his school or his parents for his absence. Prizes for good attendance have been found very useful in primary schools. I beg to suggest one prize of 10*s.*, three of 5*s.*, and five of 1*s.* every half-year, or 3*l.* a year in a school of 100 boys.

The following *form of register* is one which I have recommended to some of the school committees, to be adopted in the interim before a register can be issued on authority.

NUMBER.	Boy's Name.	Mon.		Tues.		Wed.		Thurs.		Friday		Total of half-days.	Missed Muster.	Attendance Number.
		June 1.		2.		3.		4.		5.				
1	Jno. Smith.	a.m.	p.m.	a.m.	p.m.	a.m.	p.m.	a.m.	p.m.	a.m.	p.m.	A	B	6·1
		P		·½	·1	0	1	1	1	·½	1	0	·½	6½

P means fee paid.

The dot means absent at muster. Every dot involves a forfeit of $\frac{1}{10}$ of a day; 1 means present throughout the half day; $\frac{1}{2}$ is given if the boy arrives over half an hour, and less than one hour after muster; and 0 if he does not appear at all, or arrives over one hour after muster.

At the close of every half-year, each boy's attendance numbers, as shown in column B, are added up, to ascertain who have earned the prizes for attendance.

Every week the figures in column A are added up, and divided by the number of boys who have attended at all during the week. The result will be the average attendance in half-days of those who attended at all during the week. A weekly return will then be drawn up in the following shape :—

DATE.	Number on Register.	Present during the Week.	Absent.			Average attendance in half-days of those who attended at all during the week
			Sick.	With reasonable cause.	Without reasonable cause.	
June 1 to 8	82	72	5	3	2	9·2
" 8 to 15	80	74	3	3	0	9·3

I have also suggested that another book be kept by the head master, in which the names of all the boys who have attended the classes are entered, in the following form :—

BOY'S NAME. (Written by himself.)	Date of Entry.	Age on Entry.	Father's Occupation.	Present School, if any.	Proficiency on joining.	Date of leaving.	Cause of leaving.	Prizes obtained.	Any informa- tion as to his after career.

I have also suggested that the names of all prize boys be printed on the walls of the schoolroom.

Mr. Scaping, the very intelligent head-master at Hull, attaches great value to a book in which he enters good and bad marks against the boys' names. These are given during the daily lessons. The prizes given by the Trinity Board are awarded to the boys with the largest number of good marks.

Having given at length suggestions for improving the internal constitution of the Navigation schools, to make them as attractive as possible to parents and boys, I will proceed to state what would be the probable expense of the plan proposed by me. I am aware that the expense will be considerable, but as I did not receive

any instruction naming any limit to the sum that the Department might have in their power to spend on the schools, I have throughout my suggestions considered efficiency as the *first* object and economy as the second.

A rough Estimate of the Expense of a Navigation School, if the Alterations I propose are carried into effect.

The Navigation class is supposed to consist of 100 boys; 12 adults in the forenoon and afternoon; 30 adults, apprentices, and boys in the evening class.

	£ s.
100 day boys, fee 6d. a week, as an average between 1d. and 1s.; } for 46 weeks	115 0
Evening classes—30 students, averaging 6d. a week for 46 weeks—	34 10
12 adults at 5s. a week for 52 weeks*—	156 0
	<hr/>
Receipts - - - - -	305 10

Masters' Payments.

	Fixed Payment.	Group Money, probably.	Examination Money. Maximum.	Share of Half Evening Fees.	$\frac{1}{10}$ th of Adult Fees.	TOTAL.
HEAD MASTER. Upper school of boys	100	30	30	7 17 0	—	167 17 0
1st ASSISTANT MASTER. For adults.	80	20	—	3 2 9	15 12	118 14 9
2d ASSISTANT MASTER. Lower boys.	60	20	12	3 2 9	—	95 2 9
1st PUPIL-TEACHER. Upper boys.	15	—	6	1 11 4	—	22 11 4
2d PUPIL-TEACHER. Lower boys.	15	—	6	1 11 4	—	22 11 4
TOTAL - - -	270	70	54	17 5 2	15 12	426 17 2

* Great inconvenience is expected to attend the breaking up of the *adult* class for the Christmas and Midsummer holidays, as their vessels are frequently in harbour for only a few weeks at a time. I have assumed that some arrangement will be made among the masters to relieve the assistant-master in charge of the adult class of his charge for a portion of the holidays. I have made the estimate on the assumption that the number of adults is 12. Many of the masters undertake a much larger number.

EXPENDITURE.	£ s.	RECEIPTS.
Salaries of masters and pupil teachers - - - - }	394 0	Received by local committee—
Value of prizes at the rate of 15 <i>l.</i> per half year, and 3 <i>l.</i> for attendance " "	33 0	Half evening fees - - - 17 5
Value of exhibitions—		All boys fees - - - 115 0
4 boys' excused fees £ s. and rec. 6 <i>d.</i> a week 9 4		<i>1/10</i> of adult fees - - - 140 8
4 boys' excused fees, and rec. 1 <i>s.</i> a week 13 16	46 0	
4 boys' excused fees, and rec. 2 <i>s.</i> a week 23 0		
	£473 0	
		Total receipts - - - 272 13
		Deduct local expenses } maximum estimate* }
		50 0
		Remaining in hand - £222 13

	£ s. d.
Average yearly expenditure on school	473 0 0
Receipts, less local expenses - - -	222 13 0
Deficit to be made up by the Department -	£250 7 0

The education of the boys would cost the Department about 2*l.* 10*s.* per boy per annum.

N.B.—If there were 22 adults, and they were charged 7*s.* a week, as at Liverpool, and could be instructed properly by one master, the schools would be self-supporting.

The Department would receive every quarter an account of fees received, money paid, and money due to the masters, and would have to pay the difference. The most expensive schools would be the small schools, having, say, 20 to 30 boys, and 5 to 6 adults, and an evening class of 10. For they would equally with the large school require a head master for the boys, and an assistant for the adults ; but the schools will, probably, in every case start with a small number of pupils.

Thirty navigation schools would be supported
at an annual expense to the Department, if there
were only 12 adults in each, of £7,510

Assuming that the freehold sites were purchased by contributions raised in the town, and that the Government was prepared to pay half the expense of building the schools, and that the schools cost 1,500*l.* each :—

Then the Government contribution would amount to 30 × 750	£ 22,500
And half the price of fittings, about 100 <i>l.</i> in each school	1,500
	£24,000

* I suggest this sum as a maximum, but the local committee should be enjoined to exercise the strictest economy with regard to the local expenses. The rule of the Department, to contribute 50 per cent. of the value of the books and apparatus in the first instance, and for further supplies, 40 per cent., should be adhered to.

Many of the schools might be smaller than those above indicated, but the total expense of building would be about the same.

In Ireland the schools are built and the masters paid entirely by the Board of Education, and the master receives *all* the fees.

If I am touching on a matter beyond my province in drawing attention to two sums of money which I beg to suggest might with great propriety be appropriated to the building and support of the Navigation schools, I trust the object I have in view may be a sufficient apology.

(1.) The fees received at the ports where there are local marine boards are in excess of the expenditure to the amount, I am informed, of about 8,000*l.* a year.

This sum would support more than 30 navigation schools of 100 boys each.

(2.) When seamen die in the commercial marine their effects are sold, and on the return of the vessel to England, the money received, together with the wages due, is paid over to a department of the Government. Every exertion is made to ascertain who are the heirs of the deceased seamen. In many cases their exertions meet with no success. A large balance, amounting, I am informed, to more than 50,000*l.* has accumulated under this head, and might, I beg to suggest, be well expended in building navigation schools for the benefit of the profession to which the deceased seamen belonged.

The principal obstacles in the way of success, in addition to the inefficiency of the schools, the absence of prizes, &c., are three in number.

It is my firm belief that if the Department assist liberally the establishment of navigation schools, placing them on a proper footing, and stating that they are schools established for the *sole* purpose of giving special instruction in scientific subjects to boys intended for the *Royal Navy and the Commercial Marine*, these three obstacles will gradually vanish. They are,—

(I.) *A Disinclination on the part of Shipowners to enter Boys.*

In reply to my inquiries the owners of *steamers* stated, "We don't want boys, who eat as much as men, are of very little use, and give a great deal of trouble; we want men."

Steam having superseded the use of sails to a great extent, boys, who in sailing vessels are invaluable for light work aloft, are not valued in steamers.

Many of the sailors, so-called, that we find in steamers differ very little from landsmen, except that they are not sea-sick, they can take the wheel and pull an oar. To all the valuable qualities of a true sailor, which were developed by and almost entirely due to his work aloft, viz., agility, readiness of resource, indifference to all danger that may be escaped by bodily activity, as distinct from that solid courage which all Englishmen possess, the steam sailor can lay slight claim.

In the Royal Navy we want the superior class of sailors, and if possible those alone. The partial substitution of steam for sails, while it has injured our own sailors has, in the same way and for the same reason, injured those in the commercial marine, on whose aid and support we may at any time be thrown for a supply of seamen.

It is most important, therefore, that every impulse should be given to keep up in the commercial navy both the quantity and quality of the seamen; it is much to be regretted, therefore, that the same disinclination to take boys, although fortunately in a less degree, exists among the shipowners of *sailing vessels*.

Lads enter on board merchant ships, some as apprentices, some as boys.

In the employment of the larger shipowners apprenticeships are highly valued.* The proportion of apprentices to tonnage at present is about 1 to 200 tons. Before the repeal of the navigation laws, it was by Act of Parliament 1 to every 100 tons.

The disinclination to enter boys will, I believe, gradually vanish when the attention of the shipowners, as a body, is attracted to the valuable class of boys who will attend the Navigation schools, for they will be induced to reflect, that although at first sight it may appear to be more economical to enter no boys or apprentices, or a very few only, and those at very low wages,† yet that by so doing they are contributing indirectly, but yet surely and certainly, to the deterioration of the whole class of seamen, and to the ultimate injury of the ship-owning interest.

(II.) *A Disinclination on the part of parents to send their Boys to Sea.*

While sailors are, what they frequently are at present, not the most moral or respectable members of society it is probable and natural that many parents would regret their sons' choice of the sea as a profession.

But as sailors and masters improve by the aid of navigation schools, where they will be instructed in their youth, and are received in sailors' homes at every port where their vessels touch, this class of objections will gradually become obsolete; and the profession of the sailor will take its proper place by that of the high skilled mechanic as one of the noblest professions a working man's son can adopt, being also one of the highest paid; 3*l.* and 4*l.* a month besides victuals and medical attendance being the not uncommon emoluments of a merchant seaman. Moreover, the profession of a sailor, if he is a steady man, may be rendered both healthy, improving, and entertaining, and acts most bene-

* The value attached to an apprenticeship varies largely with the employs, the port, &c. Mr. Green charges 180*l.* for a four-years' apprenticeship as a midshipman. Large shipowners at Glasgow and elsewhere pay 35*l.* for a similar term to a common apprentice.

† Owing to the low rate of wages referred to, large numbers of apprentices run every year, after they have served a portion of their time.

ficially on the character and temper. Steam and science are rapidly diminishing the longest voyages, and long periods of absence, one of the not unnatural objections of a parent, are becoming the exception instead of the rule.

The wish to go to sea is implanted by Providence, doubtless for the wisest purposes, in large numbers of the boys of these islands, frequently in those who have never seen the sea. Those parents, ministers, or schoolmasters who take upon themselves to thwart this natural and laudable wish, going the length, as they frequently do, of treating the boy's desire as an evidence of a vagabond and depraved taste, may be fairly charged with the responsibility of the boy's immoral and depraved life, if such unfortunately is the result of his going to sea, for his naval career is probably commenced by running away from home, and he thus severs all those domestic ties which conduce so much to the preservation of purity of life and manners.

This conduct on the part of parents should be deprecated by every one who has the best interests of his country at heart.

Every respectable and well conducted boy who desires to go to sea should be aided and assisted to do so, and this course should be systematically adopted throughout the country. The Government, by the support of navigation schools, show their opinion on this subject. It only remains for the schools to be put on a proper and liberal footing, worthy of the Government and of the object which they are intended to serve. When this is done, the profession of the sailor will be rescued in the minds of the lower classes from all the odium which at present surrounds it.

(III.) *A Disinclination on the part of Boys to go to Sea.*

This disinclination exists in some ports and not in others, it will decrease wherever it exists when Navigation schools, established on a liberal footing, offering the inducements I have suggested, are placed near the docks in every seaport town of any size or importance. It is advisable that the schools should be so placed that the boys can when out of the school play about among the shipping, witness and long to imitate the evolutions of the sailors aloft, &c.

An attractive evening class will have to be established for the instruction of boys who have to work for their livelihood during the day, and for apprentices. I have proposed that half the fees be given to the educational staff, to insure their taking a direct pecuniary interest in the evening class.

In concluding this report, I wish to state, that I am fully impressed with the great benefit that the establishment of good Navigation schools would confer directly on the ROYAL NAVY, the Commercial Marine, and the country; and that I see every reason for believing, that if the schools are placed on a proper footing, the classes will be largely attended, and the schools will answer every purpose for which they are established. The limited number of *thirty* Navigation schools, which I have suggested, should be forthwith established, although only pro-

fessing to assist in providing a sufficient supply of educated young men to fill up the vacancies among the masters and mates, yet cannot fail to tell with the best effect on the commercial marine generally. For these well-educated lads, who, after leaving the Navigation schools, have to struggle through that large body, the seamen of the commercial marine, before they can win the prizes of their profession, must raise the tone of the class through which they pass.

If the thirty schools are established, and after two or three years are evidently working well, it will be worth considering whether more schools of a simpler and less expensive character should not be established to educate a sufficient number of lads fully to supply the vacancies in the seamen class.

The alterations I have proposed in the mode of payment of the educational staff are those upon which I desire to lay the most stress; they have had but one object in view, the making it the personal *pecuniary* interest of each member of the staff to devote himself zealously to those duties, and to no other, which the Department wishes him to perform. In individual cases, we might appeal to higher motives than these, but in dealing with a body of men, however upright and conscientious, I am firmly convinced that there is no safer course than the appealing to the lower motive in aid of the higher.

I have already drawn up and sent to the Department an account of each school, with the examination I conducted, and also replies to various questions suggested by the directory furnished to me in proof.

I have, &c.

ALFRED P. RYDER, Capt. R.N.



APPENDIX I.

13,200 Foreigners were serving in the Mercantile Marine in 1854, natives of the following countries :—

Americans (U.S.)	3,888	Russians	-	44
Austrians	532	Prussians	-	563
Belgians	198	Spaniards	-	388
Danes	428	Swedes	-	1,512
Germans	319	French	-	479
Greeks	76	Various, viz., South Americans, Chinese, &c., &c.	-	2,499
Hollanders	1,030	Total	-	13,200
Italians	110			
Norwegians	570			
Portuguese	564			

J. H. BROWN,
Registrar-General of Seamen and Shipping.

Nov. 26, 1858.

APPENDIX II.

A RETURN of the Number of Apprentices bound and registered at the several Ports of the United Kingdom, during the year 1856.

Name of Port.	Number Registered.	Name of Port.	Number Registered.
Aberystwith	5	Fleetwood	-
*Arundel	52	Folkestone	-
Barnstaple	15	Fowey	-
Beaumaris	2	Gainsborough	-
Berwick	3	Gloucester	-
Bideford	17	Goole	-
Boston	5	Grimsby	-
Bridgewater	15	*Hartlepool	-
Bridport	3	Harwich	-
*Bristol	83	*Hull	-
Caernarvol	9	*Ipswich	-
*Cardiff	73	Lancaster	-
Cardigan	26	*Liverpool	-
Carlisle	3	Lowestoft	-
Chepstow	8	Llanelli	-
Chester	0	Lyme	-
*Colchester	81	Lynn	-
Cowes	12	Maldon	-
*Dartmouth	88	*Maryport	-
Deal	1	*Milford	-
Dover	2	*Newcastle	-
Exeter	27	Newhaven	-
Falmouth	12	Newport	-
Faversham	29	Padstow	-

Name of Port.	Number Registered.	Name of Port.	Number Registered.
Penzance	8	Grangemouth	2
*Plymouth	38	Greenock	85
Poole	2	Irvine	2
Portsmouth	23	Kirkaldy	16
Preston	5	Kirkwall	9
Ramsgate	18	*Leith	12
Rochester	16	Lerwick	42
Rye	10	*Montrose	0
Saint Ives	1	Perth	30
*Scarborough	50	*Peterhead	4
Scilly	8	Port Glasgow	34
*Shields	1,415	Stornoway	0
*Shoreham	60	Stranraer	0
*Southampton	33	Wick	0
*Stockton	62	Wigtown	45
*Sunderland	583	Ballina	0
*Swansea	83	*Belfast	0
Teignmouth	5	Coleraine	0
Truro	0	Cork	17
Wells	2	Drogheda	9
Weymouth	4	*Dublin	50
*Whitby	106	Dundalk	0
*Whitehaven	143	Galway	0
Wisbeach	18	Limerick	9
Woodbridge	2	Londonderry	0
Workington	22	Newry	0
Yarmouth	23	Ross	1
Jersey	8	Skibbereen	0
Guernsey	13	Sligo	2
*London	1,393	Strangford	4
*Aberdeen	134	Tralee	0
Air	4	Waterford	14
Alloa	2	Westport	0
Arbroath	23	Wexford	10
Banff	19	Total, 1856	7,410
Borrowstouness	1	Total, 1857	6,850
Campbeltown	0		
Dumfries	22		
*Dundee	97		
*Glasgow	141		

Nov. 26, 1858.

J. H. BROWN,
Registrar-General of Seamen.Note.—An * has been placed against the names of the ports that sent
30 and over 30 apprentices to sea in 1856. They are 32 in number, and sent
6,578 apprentices to sea in that year.

A. P. R.

APPENDIX III.

General Register and Record Office of Seamen,
Adelaide Place, London Bridge, June 26, 1858.

RETURN of the Number and Tonnage of British Registered Vessels, exclusive of River Steamers, employed in the Home and Foreign Trade of the United Kingdom in the Year 1857 (not including repeated voyages), with the Number of Men employed, classified according to Capacity—Masters are NOT included. This Return embraces Vessels belonging to the Channel Islands, but not Vessels belonging to the Colonies.

Ships.	Tons.	Men.	Classification of Crews.									
			Mates.	Petty Officers.	A.B. Sea-men.	O.S. Sea-men.	Apprentices and Boys.	Other Persons.	Engineers.	Firemen.	Foreigners.	Lascars.
19,328	4,211,482	176,887	21,204	13,232	66,854	16,828	23,974	12,640	1,612	4,896	14,375	772

NOTE.—Home-trade ships are ships trading on the coasts of the United Kingdom, or to ports within the limits of the river Elbe and Brest. Foreign-going ships are ships trading beyond those limits.

No ship is included which has not been reported as a Foreign-going ship within four years, or as a home-trade ship within one year.

Lascars are not included under the head of foreigners.

Many apprentices are serving in the capacity of mates.

J. H. BROWN,
Registrar-General of Seamen and Shipping.

RETURN of the Number of Men (exclusive of Masters) employed in Vessels belonging to the United Kingdom and Channel Islands in the Years 1851, 1852, 1853, 1854, 1855, 1856, and 1857, distinguishing British from Foreign.

Vessels registered in the Colonies are not included.

Years.	British.	Foreign.	Total.
1851	136,144	5,793	141,937
1852	153,863	5,700	159,563
1853	165,174	7,351	172,525
1854	149,216	13,200	162,416
1855	155,610	12,927	168,537
1856	160,597	13,321	173,918
1857	162,012	14,375	176,387

J. H. BROWN,
Registrar-General.

General Register and Record Office of Seamen,
London, July 19, 1858.

Note.—The masters are about 19,000 in number, including masters of coasters.

A. P. R.

APPENDIX IV.

RETURN of the Number of Persons who have passed their Examinations during the Years 1856, 1857, to the 25th November 1858, setting forth the several Capacities for which they passed.

Capacity.	Years.		
	1856.	1857.	1858.
Extra Masters -	22	16	33
Ordinary Masters -	1,223	1,047	887
First Mates -	689	539	419
Only Mates -	1,223	895	580
Second Mates -	940	830	666
Total -	4,097	3,327	2,585

J. H. BROWN,

Nov. 26, 1858. Registrar-General of Seamen and Shipping.

APPENDIX V.

TABLES of MORTALITY of SEAMEN for the Years 1855, 1856, and 1857 extracted from Tables prepared at the Board of Trade.

1855.

Ages.	Total Deaths.	Number Drowned, included in Total.
Under 20 -	553	250
20 and under 30 -	1,235	405
30 and under 40 -	546	137
40 and under 50 -	252	53
50 and under 60 -	89	13
60 and upwards -	17	4
Unknown -	925	170
	3,617	1,032

1856.

Ages.	Total Deaths.	Number Drowned.
Under 20 -	595	289
20 and under 30 -	1,549	574
30 and under 40 -	548	143
40 and under 50 -	245	59
50 and under 60 -	105	20
60 and upwards -	20	5
Unknown -	981	256
	4,443	1,346

1857.

Ages.	Total Deaths.	Number Drowned.
Under 20	644	322
20 and under 30	1,333	527
30 and under 40	507	173
40 and under 50	223	75
50 and under 60	67	13
60 and upwards	25	9
Unknown	990	370
	3,789	1,489

Note.—The following is an attempt, from the few facts and returns that are available, to give an estimate of the probable numbers of vacancies that occur in the Commercial Marine, from the combined effects of desertion and change of profession; the number that occur from death being known. The facts that may be gathered from the returns, and on which the conclusion must be founded, are the number of the Commercial Marine, 200,000 in round numbers; the period of commencing the naval career, 16 years; the tables of mortality and the laws of probability which (in the case of the Northampton tables) give 35·85 years as the probable duration of life of a boy in good health at 16; the average probable number of deaths in such a body, viz. 5,579; the statistical fact that 2,660 only do die of disease and 1,300 from drowning.

If I am not mistaken, the following ratio, if not absolutely correct, will afford an approximation to the information required; as—

$$\left. \begin{array}{l} \text{The supply} \\ \text{required to fill} \\ \text{up vacancies by} \\ \text{death in a body} \\ \text{of 200,000 men} \\ \text{who commence} \\ \text{a career in good} \\ \text{health at 16} \\ \text{years of age,} \\ \text{and all die in} \\ \text{harness, viz., by} \\ \text{Northampton} \\ \text{tables,} \\ 5,579. \end{array} \right\} : \left. \begin{array}{l} \text{Probable a-} \\ \text{verage length} \\ \text{of life after} \\ \text{commencing} \\ \text{that career} \\ \text{which is also} \\ \text{ascertained} \\ \text{from the} \\ \text{Northampton} \\ \text{Tables,} \\ 35\cdot85 \text{ years.} \end{array} \right\} :: \left. \begin{array}{l} \text{Number of} \\ \text{deaths that ac-} \\ \text{tually do occur} \\ \text{annually in the} \\ \text{said profession,} \\ 2,600. \end{array} \right\} : \left. \begin{array}{l} \text{The average} \\ \text{period of time} \\ \text{that the 200,000} \\ \text{persons remain} \\ \text{in that pro-} \\ \text{fession,} \\ 17 \text{ years.} \end{array} \right\}$$

If this is true, then $\frac{200,000}{17}$ or 12,350 is the number of vacancies occurring annually, of which, 2,600 occur from death from diseases, accidents, &c., 1,300 from drowning, leaving about 8,390 owing to desertion, &c. &c.

The difference between 2,660 and 5,579 cannot be accounted for on the assumption that there is at present less sickness and mortality among the seamen than on shore; we have no reason for supposing that such is the case. It evidently arises from their short stay in the service. For a more accurate investigation, see Appendix VI.

APPENDIX VI.

A FURTHER INVESTIGATION into the NUMBER of MEN who leave the COMMERCIAL MARINE yearly, in addition to those who die by Disease, Accident, and Drowning, with the view of ascertaining the Number of annual Vacancies, and the Number of Lads required to fill them up.

Let the average age on entry be 16.

Let the number of men in the Commercial Marine - = S

Let the number of men who *leave* every year by desertion, by change of profession, exclusive of those who die by disease, &c. - - - - - } = r

Let the number of seamen who are drowned every year - - - - - } = w

Let the number of seamen who die from all causes except drowning - - - - - } = d

Let the number of men who remain alive of those who have *left* the service at any time - - - - - } = R

Let the number of men *now* alive who have ever been in the service, including those still serving - - - - - } = M

Let the number of men who die every year of those who have ever been in the service - - - - - } = D

Let the number of men who die every year per 1,000, of those who have reached the age of 16 years, as ascertained from tables of mortality - - - - - } = p

Let the number of seamen who enter every year - - = E

Let the probable length of life of a healthy lad at 16 - - = L

Then, since all who enter, die eventually —

Therefore, (1) $E = D$, if S remains constant ; and

$$(2) E = r + w + d \\ \therefore D = r + w + d.$$

$$\text{But } D = \frac{S + R}{L}$$

$$\therefore \frac{S + R}{L} = r + w + d.$$

Now $R =$ the sum of a series in arithmetical progression, of which the first term consists of those seamen who left the service alive last year, or r + those who remain alive, of those who left the service the year before last ; or $\left(r - \frac{p r}{1000}\right) + \text{&c.}$

$$R = r + \left(r - \frac{p r}{1000}\right) + \left(r - \frac{2 p r}{1000}\right) + \left(r - \frac{3 p r}{1000}\right) + \text{&c.}$$

Now $S = n \left(\frac{2a + (n-1)d}{2} \right)$ when $S = \text{sum}$, a the first term,
 n the number of terms, d the difference.

$$\therefore R = L \left(r - \frac{L-1}{2 \times 1000} p \cdot r \right)$$

$$\therefore S + L \left(r - \frac{L-1}{2 \times 1000} p \cdot r \right) = r + w + d.$$

$$\therefore \frac{S}{L} + r - \frac{L-1}{2 \times 1000} p \cdot r = r + w + d.$$

\therefore Subtracting r from both sides —

$$\frac{S}{L} - \frac{L-1}{2 \times 1000} p \cdot r = w + d$$

$$\therefore r = 2000 \left(\frac{\frac{S}{L} - w - d}{\frac{L}{L-1} p} \right).$$

Now the values of L and p are to be found from tables of mortality, laws of probability, &c., and $S = 200,000$ in round numbers.

One of the tables, whose accuracy has been until lately most relied on, is the Northampton Table.

This gives as the value of $L = 35 \cdot 85$, and of $p = 13 \cdot 9$.

Owing to the improved condition of the poor, the greater attention paid to sanitary measures, &c., the Northampton Tables no longer represent with accuracy the probable length of life on shore; but the lives of the seamen class have probably not as yet been much lengthened by these causes. I have, therefore, adopted as my guide the Northampton Tables as probably the most accurate.

Substituting for S , L , and p , their values 200,000, 35.85, and 13.9,

$$\therefore r = 2000 \left(\frac{\frac{200000}{35.85} - d - w}{34.85 \times 13.9} \right)$$

$$= 2000 \left(\frac{5579 - 2660 - 1300}{484 \cdot 415} \right)$$

$$= 6690$$

And as $w = 1300$
 $\text{and } d = 2660$ } See Appendix V.

$$\therefore D = 10650$$

$$\therefore \frac{200000}{10650} \left\{ = 18 = \text{average length of service} \right\} \text{ afloat.}$$

And $18 + 16 = 34$, the average age of sailors when they leave the service from whatever cause.

$$\text{And since } R = L \left(r - \frac{L - 1}{1000} p \cdot r \right)$$

$$= 35 \cdot 85 \left(6690 - \frac{34 \cdot 85 \times 13 \cdot 9 \times 6690}{1000} \right)$$

$$R = 123,656.$$

$$\text{And } M = S + R$$

$$= 323,656.$$

S is yearly increasing in number, owing to the expansion of commerce.

The average annual increase, as deduced from the returns of the last five years, is 3,365.

∴ Total number required every year to fill up the vacancies—

Of those who leave the service	=	6,690
Of those who are drowned	-	1,300
Of those who die of disease in the		
service	-	2,660
The average annual increase	-	3,365

$$\text{Total supply required} = \underline{\underline{14,015}}$$

Careful investigations, conducted by an experienced actuary who has access to the statistical returns of the Registrar-General of Deaths, and the tables of the insurance offices, will probably result in different values being assigned to p , L , and r , and the investigation itself may assume a simpler and more accurate shape.

But the above results are sufficiently accurate for the purposes of this report, if they draw attention to the large field of useful employment for the lads of these islands which is offered by the Commercial Marine, and demonstrate that encouragement and aid towards the establishment of Navigation schools may be given without any fear of more schools being established than will suffice to instruct the yearly supply of lads that are required.

ALFRED P. RYDER.

